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Comparison of demographic and clinicopathological characteristics of refugees and Turkish citizens undergoing appendectomy

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ABSTRACT

Aims: This study aimed to compare the demographic and clinical characteristics of refugee and Turkish patients who underwent appendectomy.

Methods: The study examined 215 patients (86 refugees and 129 Turks). Data included age, sex, Alvarado score, neutrophil percentage, white blood cell count, appendix diameter, CRP level, and time to hospital admission. Clinical findings and pathology results were also evaluated.

Results: The average age was 29.51 years for refugees and 31.31 years for Turks. The Alvarado score was similar in both groups; however, the neutrophil percentage was significantly higher in the refugee group. No significant differences were found in appendix diameter, white blood cell count, or CRP levels. The refugee group showed significantly different time to admission and some symptoms (pain shifting to the lower right quadrant, loss of appetite, rebound tenderness). Pathology results indicated acute appendicitis in 80.2% of the refugee group and 79.8% of the Turkish group.

Conclusion: In conclusion, while imaging methods can be very helpful in diagnosing appendicitis in refugees who do not speak the language of the host country, we believe that the role of a translator in obtaining an accurate medical history and conducting a physical examination cannot be underestimated. The study has some limitations, and we recommend conducting more prospective and detailed research.

Keywords: Acute appendicitis, refugees, diagnostic delays, healthcare access

INTRODUCTION

Migration is the geographic movement of people from one settlement to another due to religious, political, economic, social, and other reasons. According to a report published by the United Nations High Commissioner for Refugees in 2015, there are more than 65.3 million forcibly displaced persons worldwide, including over 21 million refugees.[1] As of September 16, 2020, according to the Directorate General of Migration Management of Turkiye, 59,877 Syrians under temporary protection are hosted in 7 temporary accommodation centers in 5 provinces. Additionally, 3,559,041 Syrians under temporary protection live outside the temporary accommodation centers.[2] Most of the Syrians in Turkiye come from regions near the Syria-Turkiye border that have experienced intense conflicts. A 2015 report by the Middle East Strategic Research Center noted that the social impact of Syrian refugees in Turkiye has complicated social integration due to differences in language, culture, and lifestyle.[3]

Acute appendicitis is a condition requiring emergency surgical intervention, demanding rapid diagnosis and treatment to prevent serious complications. It is the most common cause of acute abdominal pain, with a lifetime prevalence of approximately 7%. Diagnosis of acute appendicitis involves laboratory tests, radiological imaging, history, and physical examination. The most critical aspect of treatment is making a definitive diagnosis and performing timely surgical intervention before complications develop.[4] Due to the wide range of clinical symptoms, delays in diagnosis can lead to increased risks such as perforation, abscess formation, wound infection, and sepsis. The number of Syrian refugees in Turkiye is higher than in other neighboring countries. These refugees face many health problems due to challenging living conditions, socio-economic limitations, and communication barriers.

In Turkiye, all Syrian refugees receive free healthcare services through community clinics and state hospitals. However,

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access to these services can be complicated by various factors, leading to delays in hospital visits during emergencies. This study aims to compare the presentation and outcomes of acute appendicitis cases between Syrian refugees and Turkish citizens to understand the impact of socio-economic and communication barriers on health outcomes.

METHODS

The study was conducted with permission from the Hitit University Non-interventional Researches Ethics Committee (Date: 28.06.2021, Decision No: 2021-71). All procedures were conducted in accordance with ethical guidelines and the principles of the Declaration of Helsinki. Data were retrospectively collected from system and written documents for 215 patients over the age of 18 who underwent appendectomy at Çorum Erol Olçok Training and Research Hospital and Abdulkadir Yüksel Hospital between 01.01.2020 and 01.01.2021. Refugee patients were examined at Abdulkadir Yüksel Hospital, which has a high refugee population, with 86 patients, while Turkish citizens were examined at Çorum Erol Olçok Training and Research Hospital with 129 patients. Patients were then divided into two groups based on nationality: Refugee patients (group 1) and Turkish patients (group 2).

In this study, patients' age, gender, preoperative laboratory values, Alvarado score, appendiceal diameter on imaging, time of presentation, histopathological diagnosis, and length of hospital stay were recorded. Additionally, white blood cell count (WBC), neutrophil, lymphocyte, and C-reactive protein (CRP) values were analyzed. The neutrophil/lymphocyte ratio (NLR) and CRP/lymphocyte ratios were calculated based on complete blood count data, and histopathological features were recorded from the hospital database.

Statistical Analysis

The data were analyzed using SPSS software (Statistical Package for the Social Sciences; version 25 Inc., Chicago, IL, USA), and results were expressed as mean±SD, median [interquartile range (IQR)], and percentages where applicable. The Kolmogorov-Smirnov test was used to examine the distribution of the data. Data showing normal distribution were analyzed with the student t-test. Non-parametric data were analyzed using the Mann-Whitney U test, and categorical groups were compared using the Chi-square test. A p-value less than 0.05 was considered statistically significant.

RESULTS

Out of the 215 patients who underwent appendectomy, 86 (40%) were refugees, and 129 (60%) were Turkish citizens. In the refugee group, there were 27 females (31.4%) and 59 males (68.6%), while in the Turkish group, there were 46 females (35.7%) and 83 males (64.3%). The average age in the refugee group was 29.51 years (range: 18-38), and in the Turkish group, it was 31.31 years (range: 18-67).

The Alvarado score was 6.96 (range: 2-10) in the refugee group and 7.6 (range: 2-10) in the Turkish group, with no significant difference. The percentage of neutrophils was 78.25% (range: 49.8-90.6) in the refugee group and 73.37% (range: 48.3-94.5) in the Turkish group, with a p-value of 0.048, indicating statistical significance. The white blood cell count was $13.69x10^3/\mu l$ (range: 4.6-29.76) in the refugee group and $12.62x10^3/\mu l$ (range: 5.99-26.55) in the Turkish group, with no significant difference. The diameter of the appendix on imaging was 9.6 mm (range: 6-18) in the refugee group and 9.72 mm (range: 6-18) in the Turkish group, with no significant difference. CRP levels were 25.019 mg/dl (range: 0.6-156.51) in the refugee group and 31.43 mg/dl (range: 0.1-221.37) in the Turkish group, with no significant difference. Body temperature was 37.06°C (range: 36.3-38) in the refugee group and 37.04°C (range: 36.41-38.1) in the Turkish group, with no significant difference (Table).

The length of hospital stay was 1.84 days (range: 1-4) in the refugee group and 1.9 days (range: 1-8) in the Turkish group, with no significant difference. Pathology results showed that 69 (80.2%) patients in the refugee group and 103 (79.8%) patients in the Turkish group were diagnosed with acute appendicitis. Other findings unrelated to acute appendicitis are detailed in Table. The p-value for this comparison was 0.086.

The time of presentation within the first 24 hours was 18 (20.9%) in the refugee group and 54 (41.9%) in the Turkish group, with a p-value of 0.001, indicating statistical significance. The shift of pain to the right lower quadrant was observed in 59 (68.6%) patients in the refugee group and 62 (48.1%) patients in the Turkish group, with a p-value of 0.003, indicating statistical significance. Loss of appetite was reported in 93 (72.1%) patients in the refugee group and 74 (86%) patients in the Turkish group, with a p-value of 0.016, indicating statistical significance. Rebound tenderness was noted in 63 (73.3%) patients in the refugee group and 76 (58.9%) patients in the Turkish group, with a p-value of 0.031, indicating statistical significance. Sensitivity and nausea/vomiting results are detailed in Table, with no significant differences observed.

All demographic and clinicopathological results for the patients are summarized in Table.

DISCUSSION

Acute appendicitis is the most common cause of acute abdomen. It most frequently occurs between the ages of 10 and 20, with a male-to-female ratio of 1.4:1. In the United States, the lifetime risk is 8.6% for males and 6.7% for females[5]. In our study, the median age of both patient groups was approximately 28 years. Of the total number of patients, 142 (66%) were male and 73 (34%) were female. Advances in laboratory tests and imaging technologies have made accurate diagnosis easier.[6] The critical aspect of acute appendicitis is making a definitive diagnosis and performing timely surgical intervention before complications develop.

Ultrasound (US) and computed tomography (CT) are the most commonly used imaging methods to rule out appendicitis in patients with abdominal pain. Balthazar et al.[7] first used CT for diagnosing acute appendicitis in 1986. They identified inflammation signs on CT, such as an appendix greater than 5 mm in thickness and dilated, peri-appendiceal phlegmon, hypertrophied meso-appendix, and free fluid.[8] In our study, the appendix diameter was significantly larger in the refugee group, with an average of 10.31±2.71 mm compared to the other group. The time of presentation showed that 18 (20.9%) patients in the refugee group presented within the first 24

Table. Comparison between groups

		Total group (n=215)	Refugee nationals (n=86)	Turkish nationals (n=129)	p value
Gender	Male	142 (66%)	59 (68.6%)	83 (64.3%)	0.518
	Female	73 (34%)	27 (31.4%)	46 (35.7%)	
Age		31.09±10.57 (28)	29.51±8.019 (28)	23.15±11.89 (28)	0.364
Fever		37.04±0.43 (37)	37.05±0.45 (37)	37.04±0.43 (37)	0.912
Loss of appetite		167 (77.7%)	93 (72.1%)	74 (86%)	0.016
Tenderness		191 (88.8%)	72 (83.7%)	119 (92.2%)	0.052
Rebound		139 (64.7%)	63 (73.3%)	76 (58.9%)	0.031
Migration		121 (56.3%)	59 (68.6%)	62 (48.1%)	0.003
Nausea		172 (80%)	74 (86%)	98 (76%)	0.07
Alvarado score		6.84±2.07 (7)	7.19±1.98 (7)	6.61±2.10 (7)	0.045
Appendiks diameter		9.72±2.74 (9)	10.31±2.71 (10)	9.33±2.71 (9)	0.001
WBC		12.80±4.42 (12.43)	13.38±4.70 (12.71)	12.41±4.20 (11.95)	0.142
NE#		9.87±4.31 (9.55)	10.39±4.56 (10.10)	9.52±4.12 (9.16)	0.211
LY#		1.91±0.86 (1.78)	1.93±0.72 (1.84)	1.90±0.94 (1.63)	0.120
CRP		26.09±36.10 (12.3)	21.22±27.49 (9.98)	29.34±40.62 (13.50)	0.552
NLR		6.31±4.17 (5.16)	6.69±4.95 (4.86)	6.06±3.55 (5.24)	0.991
CLR		18.10±35.39 (6.94)	13.55±22.60 (5.10)	21.14±41.62 (9.48)	0.443
Admission within 24 hours		72 (33.5%)	18 (20.9%)	54 (41.9%)	0.001
Histopathology	Acute appendicitis	172 (80%)	69 (80.2%)	103 (79.8%)	0.086
	Mucosele	4 (1.9%)	3 (3.5%)	1 (0.8%)	
	Lymphoid hiperplasia	32 (14.9%)	11 (12.8%)	21 (16.3%)	
	Apendix diverticul	2 (0.9%)	0 (0%)	2 (1.6%)	
	Carsinoid tumor	2 (0.9%)	0 (0%)	2 (1.6%)	
	Mild dysplasia	3 (1.4%)	3 (3.5%)	0 (0%)	
Hospitalization duration		1.92±1.24 (2)	1.90±0.895 (2)	1.94±1.42 (1)	0.226

WBC: White blood cell, NE: Neutrophil, LY: Lymphocyte, CRP: C-reactive protein, NLR: Neutrophil to lymphocyte ratio, CLR: CRP to lymphocyte ratio, *Mann-Whitney U test, median (interquartile range [IQR]) **Chi-square test, n (%) ***Student t-test, mean±SD, SD: Standard deviaiton

hours, which we believe is largely due to delays in seeking hospital care. Studies indicate that an increased appendix diameter is a risk factor for perforation and complications.[9] Many researchers have found that barriers to healthcare lead to delays in presentation and increased perforation rates; issues such as insurance status[10] and race/ethnicity[11,12] are associated with perforation.

Migration occurs for numerous interrelated cultural, economic, religious, ethnic, and political reasons. Migrants may encounter various issues in the host country, including significant challenges in accessing healthcare services. Refugees may face difficulties in healthcare due to communication barriers and language differences, similar to other social issues. Existing barriers include language obstacles, uncertain access to health insurance, and conflicts between medical treatments and cultural or religious beliefs.[13] In our study, we believe that the late presentation of refugees was not related to insurance status but rather to communication difficulties and language differences in accessing healthcare.

In diagnosing acute appendicitis, it is crucial to evaluate clinical history, physical examination, and laboratory values, rather than relying solely on imaging methods. Symptoms such as rebound tenderness, right lower quadrant pain, nausea/vomiting, and loss of appetite, along with blood tests, support the diagnosis. In a meta-analysis of 3,382 patients, leukocytosis (leukocyte count >10,000/mm^3) had a sensitivity of 83% and specificity of 67% for diagnosing acute appendicitis, while neutrophilia (neutrophil count >6,500/mm^3) had a sensitivity of 71-89% and specificity of 48-80%.[14] Other studies have shown that the average NLR (neutrophil leukocyte count) value in acute appendicitis cases is 7.35±5.90, compared to 2.60±1.35 in negative appendectomy cases, demonstrating a significant association between high NLR values and acute appendicitis.[15] In our study, while there were no statistically significant differences in hemogram parameters between the groups, our findings are consistent with existing research.

The Alvarado score and symptoms were significantly different in the refugee group compared to the other group. We attribute this to the delayed hospital presentation and the full development of symptoms in the refugee group.

This study highlights the significant differences in presentation time, appendix diameter, and appendicitis symptoms between the refugee and Turkish groups. We believe these differences are due to the challenges refugees face in integrating into our country, communication issues, and difficulties adapting.

According to the United Nations High Commissioner for Refugees (UNHCR) 2017 data, 65.6 million people are forcibly displaced worldwide, with Syria being one of the

three main countries of origin for refugees, and 64.6% of Syrian refugees live in our country.[16] An international multi-center study involving over 250 healthcare professionals identified eight specific challenges in treating asylum seekers and refugees: language and communication issues, disease due to cultural differences, different understanding of health and treatment, inadequate access to medical history, concerns about healthcare costs, insufficient familiarity with the healthcare system, mistrust, and societal poverty resulting from traumatic events.[17]

Limitations

Pathology results indicated that 69 (80.2%) patients in the refugee group and 103 (79.8%) patients in the Turkish group were diagnosed with acute appendicitis, with a p-value of 0.086. One of the main limitations of our study is that we did not specify whether patients had complicated appendicitis based on pathological diagnoses and surgical notes. Including information on complicated appendicitis cases would have added value to our study. Another limitation is the retrospective nature of the study and the potential for incomplete patient information.

CONCLUSION

In conclusion, while imaging methods can be very helpful in diagnosing appendicitis in refugees who do not speak the language of the host country, we believe that the role of a translator in obtaining an accurate medical history and conducting a physical examination cannot be underestimated. The study has some limitations, and we recommend conducting more prospective and detailed research.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was conducted with permission from the Hitit University Non-interventional Researches Ethics Committee (Date: 28.06.2021, Decision No: 2021-71).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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